

WHAT IS CLAIMED IS:

1. A centrifuge for removing more dense material from a fluid medium, comprising:
 - a fluid separation wall placed within a sleeve to
 - 5 form a containment zone therebetween;
 - the containment zone operable to receive a portion of the fluid medium having a greater concentration of the more dense material;
 - the fluid separation wall aligned generally parallel
 - 10 to an axis of rotation and operable to rotate relative to the axis of rotation;
 - at least one receptacle forming a part of the fluid separation wall such that the at least one receptacle includes a void area;
 - 15 the at least one receptacle operable to aid in separation of the more dense material from the fluid medium;
 - at least one opening extending through the fluid separation wall from the void area to the outer surface
 - 20 of the receptacle;
 - the at least one opening operable to transport the more dense material to the containment zone;
 - a valve ring forming a part of the fluid separation wall, the valve ring including at least one valve orifice
 - 25 formed in the valve ring; and
 - the valve ring having a first position which blocks the more dense material from exiting the receptacle and a second position that allows the more dense material to exit the fluid separation wall and move into the
 - 30 containment zone.

2. The centrifuge of Claim 1, wherein the fluid separation wall further comprises a plurality of the receptacles, each receptacle formed in the void area and having one or more respective openings.

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3. The centrifuge of Claim 1, wherein the centrifuge comprises a density screen type centrifuge.

4. The centrifuge of Claim 1, wherein the
10 centrifuge comprises a split-cone centrifuge.

5. The centrifuge of Claim 1, further comprising:
a pin operably engaged with the fluid separation wall, the pin extending radially from the fluid
15 separation wall; and

a slot formed in the valve ring, the slot operably formed to receive the pin therethrough and to guide the valve ring between the first position and the second position such that a valve orifice aligns with the
20 respective opening in the second position.

6. The centrifuge of Claim 1, further comprising:
a pin operably engaged with the valve ring, the pin extending radially through the valve ring to engage a
25 slot; and

the slot formed in the fluid separation wall, the slot operably formed to receive the pin and to guide the valve ring between the first position and the second position such that a valve orifice aligns with the
30 respective opening in the second position.

7. The centrifuge of Claim 6, wherein the slot comprises an oval shaped slot operably designed to restrict the movement of the valve ring.

5 8. The centrifuge of Claim 6, wherein the pin comprises a bolt.

9. The centrifuge of Claim 1, further comprising a detent or stop formed in the valve ring, the detent
10 operable to maintain the valve ring in the first position.

10. The centrifuge of Claim 1, further comprising;
an upper wedge coupled to the fluid separation wall,
15 the upper wedge operable to restrict the movement of the valve ring; and

a lower wedge coupled to the fluid separation wall, the lower wedge operable to restrict the movement of the valve ring.

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11. The centrifuge of Claim 1, further comprising a pressure sensor operably coupled to the fluid separation wall, the pressure sensor operable to determine pressures within the fluid separation wall.

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12. The centrifuge of Claim 1, further comprising an actuator operable to cause the valve ring to move between the first position and the second position.

13. The centrifuge of Claim 12, wherein the
actuator comprises a brake pad and a solenoid operable to
engage a portion of the valve ring to cause the valve
ring to move between the first position and the second
5 position.

14. The centrifuge of Claim 12, further comprising
a controller operable to control the actuation of the
actuator.

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15. The centrifuge of Claim 1, further comprising
at least one vane disposed on the valve ring, the at
least one vane operable to interact with compressed air
to cause the valve ring to move between the first
15 position and the second position.

16. The centrifuge of Claim 1, further comprising a
spring coupled between an outer section of the fluid
separation wall and the valve ring, the spring operable
20 to bias the valve ring toward the first position.

17. A centrifuge for removing more dense material from a fluid medium, comprising:

a fluid separation wall placed within a non-rotating sleeve to form a containment zone therebetween;

5 the containment zone operable to receive a portion of the fluid medium having a greater concentration of the more dense material;

the fluid separation wall aligned generally parallel to an axis of rotation and operable to rotate around the
10 axis of rotation;

at least one receptacle forming a part of the fluid separation wall such that the at least one receptacle includes a void area, the at least one receptacle operable to aid in separation of the more dense material
15 from the fluid medium;

at least one opening extending through the fluid separation wall from the void area to the outer surface of the receptacle;

the at least one opening operable to transport the
20 more dense material to the containment zone;

a valve ring forming a part of the fluid separation wall, the valve ring including at least one valve orifice formed in the valve ring;

the valve ring aligned perpendicular to the axis of
25 rotation and operable to slide along the fluid separation wall to move between open and closed positions; and

the at least one valve orifice operable to align with the at least one opening such that the more dense material exits the fluid separation wall and moves into
30 the containment zone.

18. The centrifuge of Claim 17, further comprising
a wear insert nozzle disposed in the opening, the wear
insert nozzle operable to seat against the valve ring and
guide the more dense material from the receptacle to the
5 containment zone.

19. The centrifuge of Claim 18, wherein the size of
the orifice is smaller than the size of the wear insert
nozzle.

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20. The centrifuge of Claim 18, wherein the wear
insert nozzle comprise replaceable wear insert nozzles.

21. A method of separating more dense material from a fluid medium in a centrifuge, comprising:

rotating a fluid separation wall around an axis of rotation within the centrifuge to produce a centrifugal
5 force that causes the more dense material in the fluid medium to separate from the fluid medium;

compressing the separated more dense material in at least one flow path of a receptacle by blocking at least a portion of the at least one flow path with a portion of
10 a valve ring; and

moving the valve ring along an outer surface of the fluid separation wall to release the more dense material compressed within the flow path such that the more dense material exits the fluid separation wall.

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22. The method of Claim 21, wherein moving the valve ring comprises rotating the valve ring along the axis of rotation to align at least one valve orifice with at least one flow path.

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23. The method of Claim 21, wherein moving the valve ring comprises moving the valve ring generally perpendicular to the axis of rotation such that the portion of the valve ring moves from a first position
25 blocking the flow path to a second position opening the flow path.

24. The method of Claim 21, wherein the moving the valve ring comprises sliding the valve ring along an
30 outer portion of the fluid separation wall.

25. The method of Claim 21, wherein moving the valve ring further comprises stopping the movement of the valve ring such that the at least one valve orifice aligns with at least one flow path in the stopped
5 position.

26. The method of Claim 21, wherein moving the valve ring further comprises stopping the movement of the valve ring at a detent position.
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27. The method of Claim 21, further comprising automatically controlling the movement of the valve ring using a pre-time actuator.

15 28. The method of Claim 21, further comprising automatically controlling the movement of the valve ring using an intermittent actuator.

29. The method of Claim 21, further comprising
20 automatically controlling the movement of the valve ring based on a predetermined condition to cause the movement of the valve ring.

30. The method of Claim 29, wherein the
25 predetermined condition is a condition selected from the group consisting of a pressure level within the fluid separation wall, a particle characteristic of a clarified fluid stream, and a combination of the pressure level within the fluid separation wall and the particle
30 characteristic of the clarified fluid stream.

31. The method of Claim 21, further comprising
manually controlling the movement of the valve ring.

32. The method of Claim 21, further comprising
5 returning the valve ring to a default position using a
spring biased to the default position.

33. The method of Claim 21, further comprising
simultaneously aligning all valve orifice with the flow
10 paths along the valve ring.

34. A fluid separation wall for separating more dense material from a fluid medium in a centrifuge, comprising:

5 a generally circular wall formed around an axis of rotation with an inner surface and an outer surface such that the outer surface is further from the axis of rotation than the inner surface;

the wall including at least one receptacle, the wall operable to receive a fluid medium having more dense
10 material;

an opening formed in the wall, the opening extending from the at least one receptacle through the wall from the inner surface to the outer surface; and

15 a valve ring having at least one orifice and formed over the opening, the valve ring operable to slide along the outer surface of the wall such that the at least one orifice aligns with the opening.

35. The fluid separation wall of Claim 34, further
20 comprising:

an upper wedge coupled to the outer surface of the wall, the upper wedge operable to restrict the movement of the valve ring; and

25 a lower wedge coupled to the outer surface of the wall, the lower wedge operable to restrict the movement of the valve ring.

36. The fluid separation wall of Claim 34, further comprising a pressure sensor operably coupled to the
30 fluid separation wall, the pressure sensor operable to determine the pressure of with the fluid separation wall.

37. The fluid separation wall of Claim 34, further comprising an actuator operable to cause the valve ring to slide between open and closed positions.

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38. The fluid separation wall of Claim 34, further comprising a controller operable to control the actuation of an actuator.

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39. The fluid separation wall of claim 34, further comprising a slot and pin operable to guide the valve ring between a first and second position such that the at least one orifice aligns with the respective opening.

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40. The fluid separation wall of Claim 34, further comprising a plurality of vanes disposed on the valve ring, the vanes operable to interact with compressed air to cause the valve ring to move between open and closed positions.

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41. The fluid separation wall of Claim 34, further comprising a spring coupled between an outer section of the wall and the valve ring, the spring operable to bias the position of the valve ring.

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42. The fluid separation wall of Claim 34, further comprising a wear insert nozzle disposed in the opening, the wear insert nozzle operable to seat against the valve ring and guide the more dense material from the receptacle to the containment zone.

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